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SPECIFICATION

The warming of previously cooled digital thermometer during its exposure on the wrist is the matter of heat transfer of the body. However the mechanism of this bioheat transfer will depennd on the position of the above-mentioned thermometer on the wrist. If we use the position just over the a.radialis, then the mechanism of heat transfer, which is the only reason of warming of the previously cooled digital thermometer, is FORCED CONVECTION. The latter is calculated by the usage of Newton's Law of Cooling:

$$dQ / dt = \alpha \cdot A \cdot dT \qquad (1)$$

where **dQ / dT** is the <u>rate of heat flow</u>, **A** is the <u>surface area</u> of the sensor of the thermometer, **dT** is the <u>temperature gradient</u> between wrist and cooled thermometer, and **α** is the <u>heat transfer coefficient</u>.

If we use the position on the dorsal side of the wrist, then the mechanism of heat transfer, leading to the warming of cold thermometer, is CONDUCTION, which is the matter of Fourier's Law of Conduction:

$$dQ / dt = \lambda \cdot A \cdot dT/dx \qquad (2)$$

where **dx** is the <u>distance</u> between a.radialis and the sensor and the **λ** is <u>thermal conductivity.</u>

Taking into consideration the fact that under steady-state conditions the overall heat flow of the wrist is the same it is reasonable to join equations (1) and (2) to get heat transfer coefficient equation.

$$\alpha \cdot A \cdot dT = \lambda \cdot A \cdot dT/dx \qquad (3)$$

$$\alpha = \lambda / dx \qquad (4)$$

Then by usage of the Nusselt number, Prandtl number and Reynolds number (includes the parameter of velocity) the blood flow velocity within a.radialis can be calculated and cardiac output can be approximated from obtained result.

CLAIM : CARDIAC OUTPUT CAN BE MEASURED NON-INVASIVLY THROUGH THE MEASUREMENT OF WARMING ABILITY OF THE SKIN ON THE WRIST BY THE PREVIOUSLY COOLED ONE-FLAT-SURFACE SENSOR OF THE DIGITAL THERMOMETER AND CONSEQUTIVE APPLICATION OF LAWS OF HEAT TRANSFER, DESCRIBED IN SPECIFICATION.

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